

**Testimony of Edward S. Rubin to the
Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
U.S. House of Representatives**

**Legislative Hearing on H.R. 6258
The Carbon Capture and Storage Early Deployment Act**

**Washington, DC
July 10, 2008**

Mr. Chairman, thank you for the opportunity to testify today. My name is Ed Rubin. I am a professor in the Department of Engineering & Public Policy, and the Department of Mechanical Engineering at Carnegie Mellon University, and I was the founding director of the university's Center for Energy and Environmental Studies, and later, the Environmental Institute. Over nearly four decades, my university teaching and research have focused on problems of energy and the environment, especially issues related to coal use, air quality and climate change. For the past nine years this work has focused heavily on studies of carbon sequestration. Several years ago I also served as a Lead Author and a coordinator of the "Special Report on Carbon Dioxide Capture and Storage" undertaken by the Intergovernmental Panel on Climate Change (IPCC). Attachment 1 provides additional biographical information requested by the Committee.

For the past three years I have been working in a consulting role with the Pew Center on Global Climate Change to look at alternative policies for accelerating the deployment of CCS. As part of that work, I completed late last year a report recommending the establishment of a CCS Trust Fund to pay the full cost of ten or more full-scale demonstrations of CCS technologies at coal-based power plants in different parts of the country. The Trust Fund would raise one billion dollars a year from a small fee on fossil fuel power generation, mainly coal-burning plants.

Earlier drafts of that report, and a companion study of cost estimates and program scope, were widely circulated and presented to a broad group of stakeholder organizations, including all those here today. That work appears to have influenced the bill currently under discussion, which, I suspect, is why I was invited here to testify.

Whatever its origins, I was extremely pleased to see this bill introduced with bi-partisan support following the Senate's failure last month to tackle the issue of U.S. climate policy. It was clear from the Senate actions that the issue of climate change policy remains contentious and will take time to resolve, no matter who is the next president. The virtue of H.R. 6258 is that it can still allow our country to make urgently needed progress—this year—on a technology critical to whatever climate policy ultimately emerges in the future. It will also send a strong signal to other countries, especially China and India, that we are serious about developing ways to deal with the greenhouse gas emissions from coal use.

So today I have three simple points to make.

The **first** is that CO₂ capture and storage is a critical technology for bridging our energy and environmental objectives. It is the only way we know to reconcile the realities and importance of coal use with the need to substantially reduce CO₂ emissions linked to climate change.

Therefore we should not delay demonstrating its potential for commercial use in the electric utility industry, which is the largest source of U.S. CO₂ emissions.

Point 2 is that several full-scale demonstrations of CCS are needed **urgently** to ensure that it can indeed be used as a safe, effective and reliable technology that can allow continued use of coal

for power generation with little or no CO₂ emissions. The need for such demonstrations is universally recognized; but funding for such projects has not been forthcoming.

My estimate is that the full cost of building a CCS system at a 400 MW power plant, and operating it for five years, is between \$700 million and \$1 billion. Despite a lot of talk, and some serious commitments by a number of countries, there is today not a single large-scale CCS project at a coal plant anywhere in the world that has the full financing needed to proceed, as best I can tell. In the absence of policy mandates, industry is waiting for more government support, governments are waiting for more industry support, and the result to date has been little progress on full-scale demonstrations.

H.R. 6258 would overcome this obstacle by providing the full funding needed to demonstrate different CCS technologies using different coals in different geological settings. It would do this in a creative and efficient way by spreading the cost over a broad set of stakeholders who will benefit from the outcome of these projects. Ultimately, all residential, commercial and industrial consumers of fossil fuel electricity would bear these costs; but my estimate is that the cost to an average U.S. residential customer will be no more than about **a penny a day per household**—or about \$3 to \$5 per year—an even smaller amount than the Committee’s estimate of \$10-\$12/yr (which I believe is in error; details have been provided to the Committee staff).

Point 3 is that several changes to the current draft of the bill are needed to make it more effective and acceptable.

(a) Most important is the need to define more explicitly, and more narrowly, the mission of the Corporation established by the bill. That mission should be to:

- Identify the types of large-scale projects that are most critically needed to demonstrate and evaluate the effectiveness, cost, reliability and safety of CO₂ capture and storage for use in commercial electric power generation, within the next decade and beyond;
- Award grants and contracts that provide the full incremental cost of CCS for priority large-scale projects that are evaluated and selected on a competitive basis (with encouragement, but not a requirement, for industrial cost-sharing);
- Closely monitor the management and progress of selected projects, and report that progress to Congress and the public on a regular basis; and,
- Establish policies regarding the ownership of intellectual property developed as a result of Corporation support (a provision already in the current bill).

(b) Given this mission, I strongly urge that the language in Section 4(b) of the bill, entitled “Relationship to Department of Energy and Academic Organizations,” be **deleted**. That language muddles and diffuses the purpose of this bill. It puts the Corporation in the same business as the Department of Energy (DOE), the Electric Power Research Institute (EPRI), and other organizations whose mission is to support and carry out research and development (R&D).

R&D should not be part of the mission of the Corporation established under this bill. Its purpose should be to accelerate CCS deployment by financing and overseeing the management of large-scale CCS projects at new and existing power plants. These projects should employ technologies that already have advanced through research and development, including technologies used

commercially in smaller-scale operations, which are now ready for scale-up and demonstration in full-scale in electric utility applications—typically a scale of several hundred megawatts.

To be sure, the work of the Corporation must draw upon, and be coordinated with, the activities and programs of other organizations whose R&D mission is to develop and advance new technology. In conjunction with other programs, the Corporation would provide a much-needed catalyst to accelerate the commercial availability of CCS technologies. But the Corporation itself should not be in the business of directly funding academic organizations or other fossil energy research entities, as called for in the current bill. Such organizations do not build and operate 500 MW power plants. They are not in a position to deploy and commercialize CCS technologies at a large scale. They will likely play an important role as subcontractors who provide critical support and expertise for CCS projects funded by the Corporation. But the entities directly funded by the Corporation should be only those able to build and operate the full-scale utility projects deemed necessary to advance the commercial availability of CO₂ capture and storage as a means of reducing CO₂ emissions.

(c) Apropos of the above, the name of the Corporation should be changed to reflect the title and purpose of this bill. The word “Research” should be purged from the name of the Corporation since research is not its mission. Rather, it should be called something like, The Carbon Capture and Storage Deployment Corporation; or more simply, The CCS Deployment Corporation.

(d) The composition of the Board of Directors of the Corporation also should be modified to include representatives of other key stakeholder groups. While most board members should be drawn from electric power organizations, plus a representative of fossil fuel producers as

proposed, at least two members of the Board should be drawn from other industries and two from public organizations. For example, the two non-utility industrial members might be drawn from segments of the oil and gas industry, which today has the most experience and expertise in CCS operations. The two public members should include one government representative, such as from the Department of Energy or a relevant state agency, and one non-governmental member, such as from an environmental NGO or an academic organization. These four non-utility members provide the greater breadth of expertise and perspective needed to strengthen the Board's external credibility and public trust. Public members of the Board also should be eligible for reimbursement of travel expenses associated with Board functions.

(e) In the area of accountability, the requirement in Section 7 for a “midcourse review” by the Government Accountability Office (GAO) could be further strengthened by instead naming the National Research Council (the operating arm of the National Academies) as the group to perform the review and analysis of the Corporation's activities by no later than its fifth year of operation. Because of the importance and visibility of the Corporation's activities, I believe an independent (non-governmental) organization with the stature of the National Academies would better serve the needs of Congress and the public in overseeing the activities of the Corporation.

(f) Finally, regarding definitions, it would be helpful to define the term “retail consumers” which appears in Section 2 and elsewhere in the bill. In particular, it should be made clear that this term includes commercial and industrial consumers of fossil fuel electricity, not just residential consumers. The text in Section 4, page 6, lines 4-9 authorizing the Corporation to purchase carbon dioxide when needed also should be clarified. It is not clear under what

circumstances, or for what purpose, the Corporation itself—rather than one its contractors or grantees—would purchase CO₂.

With the modifications outlined above I believe H.R.6258 will prove to be a landmark piece of legislation that will greatly facilitate, and not obstruct or delay, future progress on climate policy. I would be happy to offer my support for such legislation and urge that it be enacted promptly.

Again, my thanks to the Committee for the opportunity to comment on H.R. 6258. I have also attached two documents that elaborate on the organizational and funding approaches taken in this bill, and the reasons its passage is urgently needed.

Sincerely,

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Attachments:

1. E.S. Rubin biographical sketch.
2. Rubin, E.S., “A Trust Fund Approach for Accelerating the Demonstration and Adoption of CCS,” Presentation to the Expert Meeting on Financing Carbon Capture and Storage Projects New York, NY, May 28, 2008. Organized by the International Energy Agency Clean Coal Centre.
3. Pena, N. and E.S. Rubin, *A Trust Fund Approach to Accelerating Deployment of CCS: Options and Considerations*, Coal Initiative Reports, White Paper Series, Pew Center on Global Climate Change, Arlington, VA , January 2008.